

# An Econometric Analysis of Presence of Association among FIIs' Trading Activities and Indian Macroeconomic Variables

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## Abstract

Foreign Institutional Investors (FIIs) is one of the major significant drivers of Indian Securities Markets. FIIs trading activities is of immense importance for Indian capital markets. Exchange rate of Indian rupee per dollar, CPI Inflation rate, Bank Interest rate and Sensex (Benchmark stock market index) are among the most relevant determinants of FIIs trading activities in India. The present study is an attempt to identify relationship among FIIs trading activities, S&P BSE Sensex, Interest rate, CPI Inflation rate and Exchange rate of Indian Rupee per dollar from January1, 2001 to December31, 2019. Time-series Cointegration test, Granger Causality and Vector Error Correction Model have been used to examine the relationship between the variables considered under present study. The results confirmed that CPI Inflation rate and Exchange rate of Indian Rupee per dollar have unidirectional association with FIIs trading (Purchase and Sales) activities as indicated by Granger causal test. Bidirectional Granger Causality is confirmed to be existing between Sensex closing value and FIIs trading activities. However, no causal relationship is found among FIIs trading activities and Interest rates as indicated by Granger causal test.

**Keywords:** Cointegration, Exchange rate, Foreign Institutional Investors (FIIs), Granger Causality, Inflation rate, Interest rate, S&P BSE Sensex, Trading Activities, VECM.

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## 1. Introduction

FIIs are those institutions viz. Investment companies, Mutual funds, Pension funds, insurance and reinsurance corporates that have been registered in any Foreign country but purposes to put their funds in the Financial Markets of India. FIIs have to register themselves under SEBI Regulations, 1995.

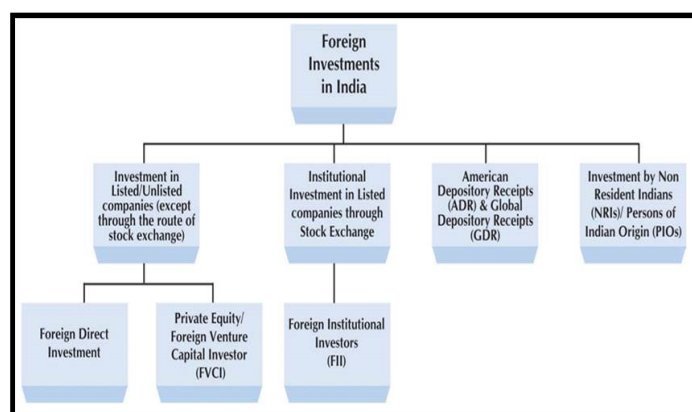


Figure 1: Foreign Investment

(Source:

<https://www.nseindia.com/content/us/ismr2009ch8.pdf>)

### **Evolvement of FIIs related policies in India**

India's growth plan was revolving around self-dependence and domestic production to substitute imports until 1980s. Current Account Deficit were funded majorly via official development assistance and debt flows. General reluctance for private commercial flows or foreign investment was there to finance Current Account Deficit since early 1990s. Then, reform process in terms to amend the India's Finance Policy remarkably for harnessing the global portfolio flows and Foreign Direct Investment was initiated. Committee on Balance of Payments reported accurately about extended plan to revive the external sector post Gulf crisis. The report suggested an integrative move the long term funds from borrowed to owned creating flows; rigorous regulations for discouraging inconstant flows from Non-resident Indians.

A progressive move towards capital account convertibility was observed post executing the suggested reforms in early 1990s. FIIs and OCBs<sup>1</sup> were restrictedly allowed for making investments in India, financial instruments from September 1992. The Indian policy for allowing FIIs investment was given under Government Guidelines Press Note published in September, 1992 that allowed the FIIs to fetch initial registration with SEBI and to take approval from RBI under FERA for five years and have to be renewed afterwards. FIIs were allowed to purchase, dispose and earn profits on funds that are invested in Indian Financial Markets by Reserve Bank of India's approval. RBI's general permission permitted Foreign Institutional Investors to put their funds in Indian Financial Markets through appointed banks and domestic custodians. The 1992 guidelines also provided eligibility criteria for registration, professional competence and other significant criteria like registration with a regulatory body, track record, financial firmness in domestic country. These given guidelines had been properly integrated in SEBI (FIIs) Regulations, 1995.

Foreign Exchange Management Regulations, 2000 were issued under enforcement of FEMA<sup>2</sup> Act 1999 in 2000. These regulations were focused to exercise foreign exchange control. RBI was given

the authority to approve foreign exchange related transactions to keep a check on the same. Institutional funds over Portfolio investments by Foreign Individuals except for Non-resident Indians were highly preferred from 1992. FIIs were given permission to invest in Equity and debt instruments being traded in Indian Financial Markets. FIIs were also given permission to put their funds in Indian Mutual Funds' schemes. The Indian FIIs related policy evolution has showcased a cautious and progressive approach to liberalize quantitative restrictions (QRs). Easing of eligibility criteria, investment limits and liberalization of investment securities available for FIIs were the major relaxations to liberalize the FIIs investments in Indian Financial Markets.

The Government of India permitted the Qualified Foreign Investors (QFIs) adhering the "Know Your Customer" norms to directly invest in domestic mutual equity and debt funds schemes for the first time through an announcement in the budget speech of 2011-12. Government released a press note in January 2012 qualifying the QFIs to put their funds in equity stock of listed Indian companies directly. Afterwards, the Government announced about its intention to allow the QFIs to invest in Indian Companies' debt instruments in budget speech 2012-13. Thus, QFIs were allowed to invest all three relevant segments viz. Mutual Funds, Equity Instruments/Market and Debt i.e. Corporate Bond Market of the Indian Financial Markets. SEBI launched a novel category of foreign investors in India that are familiar as FPIs effective from June 2014. FPIs are constituted by integrating the present categories of External investors namely FIIs & its Sub-accounts and QFIs.

FIIs are holding a remarkable share about 19<sup>3</sup> in Indian Equity Securities as growing economies such as India are exhibiting a higher growth potential relative to grown economies. India progressive growth rate has been one of significant reason for the This has been one of the major causes for the vehement FIIs flows in Indian Financial Markets from FY12 to FY15. Various reasons such as Stabilization in Macro Economic Factors, Enormous expectations from Modi Government and further decrease in FIIs

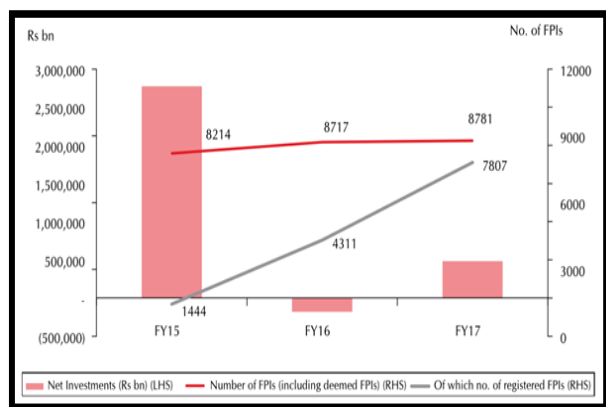
<sup>1</sup> OCB: Overseas Corporate Bonds

<sup>2</sup> FEMA is Foreign Exchange Management Act

<sup>3</sup> FII ownership for all NSE listed companies as of December 2017

debt limit were the main causes behind the hike in FIIs inflows during the FY12 to FY15. Exceptionally due to decline in GDP growth rate in third quarter of FY15, FIIs inflows turned negative in FY16. However, US economy proceeded showing positive signs of recovery and commenced the dialogues about hiking in Interest rates in the same period. FY16 was the third time when the FIIs became net sellers of the year since FIIs entered in Indian Financial Markets. The foremost was seen in FY99 during Asian crisis ((₹16 billion), the second was during Global Financial in FY09 (₹458 billion). Although, no financial crisis was felt in FY16, even then FIIs began to withdraw their investments from emerging economies and India proved no exception. Surprisingly, FIIs have been net buyers so far in the succeeding years.

Although SEBI-registered FPIs in numbers have increased tremendously to 7,807 in FY17 from 4,311 in FY16, but a marginal increase in total number of FPIs (including deemed FPIs) was observed from 8,717 to 8,781 during the same period due to high drop in number of deemed FIIs and sub-accounts of FIIs.



**Figure 2: Number of FPIs and Net Investment**  
(Source: SEBI)

As supported by all above information related to liberalization of FIIs in India, undoubtedly FIIs have become one integral part of Indian Financial Markets and one significant source of funds from foreign countries for India, thus, the researcher is aiming to find the statistical association between FIIs trading activities and macroeconomic variables in the present study. S&P BSE Sensex is known as heart of the Indian Financial Markets since January 1, 1986 the day when it was first

published, thus it is chosen for the present study along with Exchange rate of Indian Rupee per dollar, Interest rate and CPI Inflation rate.

### Literature Review

**Chakrabarty, (2001)** examined the post liberalization FII flows and its relationship with economic variables in India. FIIs flows and returns on Bombay Stock Exchange (BSE) were chosen. The results revealed that FIIs flows were highly associated with returns of Indian equity securities and they were more likely effect of these returns rather than to be cause. **Kamin & Klau, (2003)** established a statistical relation of real exchange rate and inflation rate for a large set of nations. The study confirmed about responsiveness that inflation rate depicted due to variations in exchange rate and established it to be remarkably high in US in comparison to Countries of Asia. **Bose & Coondoo, (2004)** examined the impact on Foreign investments in Indian Stocks of several FII policy reforms during January 1990-2004. The study confirmed the expansionary effect that liberalization policies have on FIIs flows. It was further confirmed that liberalization measures have hiked the FII inflows. **Muco, Sanfey, & Taci, (2004)** concluded that a move to focused inflation targeting can assist in promoting the transparency of monetary policy provided such move is introduced at time when the nation is ready for it. **Rai & Bhanumurthy, (2004)** reviewed influencing factors of FIIs in Indian Capital Markets by considering monthly returns, risk, inflation and FIIs flows in India. The authors applied ARCH regression model, GARCH model to analyze the data. The researchers recommended that calming volatility in Indian Capital Markets and reducing systematic risk would assist to get high number of FIIs flows that would bring positive influence on the true economic position. **Pal, (2005)** studied the relation of Stock market's volatility and FIIs trading behavior during election period of India. This study was done to know the reason of post-election crush in 2004. The study revealed that FII's were the major investors in domestic market and also market price also growing due to the FII's role. **Hansen & Rand, (2006)** examined Granger causal relation among FDP and GDP for thirty-one emerging economies. The study resulted in two-way causality among

Foreign direct investment to Gross Domestic Product ratio. **Asari, et al., (2011)** confirmed that the presence of unidirectional Granger Causality between “inflation rate and interest rate” and “interest rate and exchange rate” in Malaysia. Interest rate flows positively however inflation rate moves negatively towards volatility in exchange rate in context to their long run relationship. **Nwosa & Oseni, (2012)** confirmed the presence of at least one Co-integrating vector among the interest rate, inflation rate and exchange rate in Nigeria. Study results established the presence of unidirectional causal relation from both inflation and exchange rate to short term interest rate. However, a bidirectional causality is present from inflation rate to exchange rate. **Simionescu, (2014)** studied Granger causal relationship among trade and FDI for G7 countries from 2002 to 2013. The researcher found unidirectional causal relation between FDI and trade in long run. **Andreia & Andrei, (2015)** established that the economic crisis is really caused relevant influence on Foreign Direct Investment by applying Granger Causality test under VECM. The researchers studied association between various macroeconomic variables viz. GDP, FDI, Exports, Imports, labour in the study. The study confirmed that FDI had negative bearing on other macroeconomic determinants considered under study. **Chittedi, (2015)** presented a strong evidence relating to existence of short as well long run association among stock prices and macroeconomic variables in BRIC economies. However, this relation did vary from economy to economy. **Gaur & Dash, (2015)** comprehended that Foreign Institutional Investors’ trading activities had tremendous bearing on the movement of stock markets in India. **Kumari & Mahakud, (2015)** established a strong relationship between the volatility in equity market and macroeconomic variables in India. **Kajipet & Ryakala, (2016)** found that unidirectional long run causality runs from Home to Foreign Institutional Investors. However, unidirectional causality is coming by FIIs to DIIs in short period. **S. & G., (2016)** confirmed the contribution of macroeconomic variables in bringing Foreign Flows in Indian Capital Markets and it was further ascertained that macroeconomic variable did influence the volumes of trade of FIIs. **Agarwal &**

**Agarwal, (2017)** revealed that only FIIs influenced the stock markets from 2003-2016 in long period in India. However, no considered macro determinants were able to influence Indian stock markets from 1991-2002. **Neeta, (2017)** established bidirectional causality among Sensex and FIIs flows in Indian Financial Markets. The study revealed the FIIs volume trading activities’ bearing in moving Indian capital markets. **Albur, (2019)** confirmed the presence of unidirectional causality between Real Gross Domestic Product to Real Foreign Direct Investment in the period of 1990 to 2011. Further, one way causality is found to be running from GDP to DI. **Faux, (2019)** established capital as a powerful determinant of economic growth through its Error Correction Model in Cameroon. It is further evidenced that hiked inflation rates had adverse impact on economic prosperity in Cameroon. The study suggested that an effectively implemented macroeconomic policy can impact economic growth positively in country.

#### **Research Aims and Research Methodology**

The current study is focused to examine Cointegration and casual relation between FIIs’ trading activities with Exchange rate, S&P BSE Sensex, CPI Inflation rate and Bank Interest rates of India for ascertaining that whether the FIIs trading activities are causing the changes in Indian 4 major macroeconomic variables selected under study or vice versa or both are causing variations in each other. The current study is also attempting to ascertain that whether FIIs are bringing variations in closing value of Sensex or not. The researcher has selected January 1, 2001 to December 31, 2019 as time period in present study. The present study requires monthly data related to FIIs Purchases, FIIs Sales, and Macro Economic Variables (Inflation rate based on CPI on yearly basis, S&P BSE Sensex, Bank Interest rate and Exchange rate (Indian ₹ per US \$) for the time period of January 1, 2001 to December 31, 2019. All this data is secondary by nature.

#### **Hypotheses**

- H<sub>1</sub>: There is Cointegration present among FIIs purchase activities and macroeconomic variables.  
H<sub>2</sub>: There is Cointegration present among FIIs sales activities and macroeconomic variables.



H<sub>3</sub>: Significant causal relation exists between trading activities of FIIs' trading activities and S&P BSE Sensex.

H<sub>4</sub>: Significant causal relation exists between trading activities of FIIs' trading activities and Inflation rate.

H<sub>5</sub>: Significant causal relation is present between trading activities of FIIs' trading activities and Exchange rate.

H<sub>6</sub>: Significant causal relation is present between trading activities of FIIs' trading activities and Interest rate.

## Analysis and Results

### Unit Root test

**Table 1: ADR (Augmented Dickey-Fuller) test statistic- Summary Results**

H <sub>1</sub> : Considered data series is stationary							
Period	Variables	Original Series			Adjusted Series (Variable in First Difference)		
		t-Statistic	Probability	Result	t-Statistic	Probability	Result
January 1, 2001 to December 31, 2019	FIIs Gross Purchase	-1.07912	0.7241	Has unit root	-8.56885	0.0000	Stationary
	FIIs Gross Sales	-0.96674	0.7649	Has unit root	-17.4545	0.0000	Stationary
	Sensex Closing Value	0.228189	0.9738	Has unit root	-14.58512	0.0000	Stationary
	Exchange Rate	0.002414	0.9569	Has unit root	-13.1229	0.0000	Stationary
	Interest Rate	-2.0055	0.2844	Has unit root	-17.3891	0.0000	Stationary
	Inflation Rate	-2.34298	0.1596	Has unit root	-12.2908	0.0000	Stationary

(Source: Researcher's Study)

The selected variables monthly data series relating to the period of study are undertaken through ADF test to authenticate that the considered data series have not possessed unit root. The Augmented Dickey-Fuller test' results are depicted in Table 1 and that is concluding that each original series is non-stationary, however each series turn to be stationary at I(1). Hence, Cointegration test followed by VECM will be applied on data considered under study.

### Johansen system Cointegration Test for FIIs Purchase Activities

H<sub>1</sub>: There is at least 1 Cointegration present among FIIs purchase activities and selected macroeconomic (Exchange rate, Inflation rate, Interest rate and Sensex Closing Value) variables.

**Table 2: Johansen system Cointegration (Unrestricted Cointegration Rank) Test for FIIs Purchase Activities**

(Trace)				
Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob.**
Rank = 0*	0.304783	103.8576	69.81889	<b>0.0000</b>
Rank ≤ 1	0.059805	29.33379	47.85613	0.7523
Rank ≤ 2	0.045022	16.69175	29.79707	0.6627

(Source: EViews Output)

Based upon Trace value, it is implied that there is at least 1 Cointegration is present among FIIs purchase activities and selected macroeconomic variable. The presence of Cointegration between considered variables recommends a long term association within the considered variables.

The long term association between FIIs purchase activities, Exchange rate, Inflation rate, Interest rate and Sensex for one Cointegrating vector for India during January1, 2001 to December 31, 2019 is displayed below:

### Long –Run Model: Cointegrating Equation

$$ECT_{t-1} = 1.0000*FII\_P_{t-1} + 304.903889513*EX_{t-1} + 355.953951078*IN_{t-1} - 4271.5075793*INT_{t-1} - 4.15141735916*SEN\_CL_{t-1} + 39506.7668219$$

### Estimating VECM with FIIs Purchase activities as target Variable

$$\Delta FII\_P_t = -0.755586ECT_{t-1} - 0.131001\Delta FII\_P_{t-1} + 903.5118\Delta EX_{t-1} - 1136.096\Delta IN_{t-1} - 1084.954\Delta INT_{t-1} + 2.583357\Delta SEN\_CL_{t-1} + 89.77016$$

**Table 3: VECM for FIIs Purchase activities as Target variable**

	Coefficient	Standard Error	t-Statistics	Prob.
C(1)	-0.755586	0.095464	-7.914858	0.0000
C(2)	-0.131001	0.072331	-1.811124	0.0716
C(3)	903.5118	813.7964	1.110243	0.2682
C(4)	-1136.096	1113.304	-1.020472	0.3087
C(5)	-1084.954	3028.755	-0.358218	0.7206
C(6)	2.583357	0.982448	2.629510	0.0092
C(7)	89.77016	902.3925	0.099480	0.9209
R-squared	0.440176			
Adjusted R-squared	0.423465			
F-Statistics	26.34028			
Prob(F-statistic)	0.000000			

(Source: EViews Output)

C(1) is the velocity of adjustment as it calculates the speed by which FIIs Purchase activities (Target variable) reach back to equilibrium post a change in 4 selected Macroeconomic determinant factors (independent variable). In the present model, C(1) turned to be negative and significant as highlighted in Table 3, thus fulfilling the requirement of significant VECM and confirming the existence of long term Cointegration within the considered variables under study. The R-squared value is 0.4401 which is quite acceptable value. Moreover, Prob. Value of F-statistic is 0.0000 confirming the present VECM is a good fit.

### Validating the VECM (FIIs Purchase activities as Target variable): Residual Diagnostics Test

VECM' validity is authenticated by different measures that are conducted on residuals. Residuals must be normally distributed, homoscedasticity and with no serial correlation problem. VEC Residual Normality test is applied to test normality of residuals and test results obtained the Jarque Berra's Prob. value as 0.0789 thus confirming that normality of the residuals. For testing serial correlation and heteroscedasticity, the following tests have been applied.

#### Breusch-Godfrey Serial Correlation LM Test:

H<sub>1</sub>: Serial correlation is present among residuals.

Table 4: Test Statistics:

F-Statistic	1.134300	Prob. F(2,199)	0.3237
Obs*R-squared	2.344473	Prob. Chi-Square(2)	<b>0.3097</b>

(Source: EViews Output)

As the Prob. Chi-square is 0.3097 thus H<sub>1</sub> is rejected confirming the absence of serial correlation problem among the residuals.

#### Heteroscedasticity Test

H<sub>1</sub>: Heteroscedasticity is present in the residuals.

Table 5: Breusch-Pagan-Godfrey Test

F-statistic	2.237974	Prob. F(15,191)	0.6222
Obs*R-squared	30.94323	Prob. Chi-Square(15)	<b>0.6138</b>
Scaled explained SS	94.58172	Prob. Chi-Square(15)	0.0718

(Source: EViews Output)

As Chi-Square' Prob. value is 0.6138 thus, H<sub>1</sub> does not get accepted at 5% Significance level implying that no problem of heteroscedasticity is present in the VECM derived under present study.

### Stability Diagnostics for Model

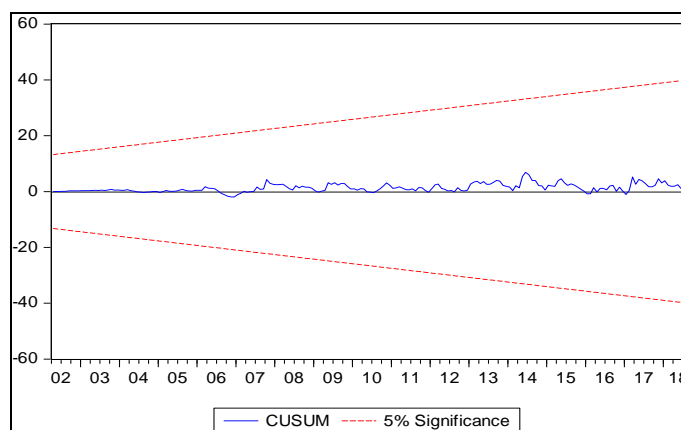


Figure 3: Cusum Test for FIIs Purchase VECM (Source: EViews Output)

The VECM Model for estimating FIIs Purchase activities is stable as blue line coming within range of red boundaries as depicted in Figure 3, Hence, the model is said to be dynamically stable.

### Johansen system Cointegration Test for FIIs Sales Activities

H<sub>1</sub>: There is at least 1 Cointegration present among FIIs Sales activities and selected four macroeconomic variables.

Table 6: Unrestricted Cointegration Rank Test for FIIs Purchase Activities

Trace				
Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob.**
Rank = 0*	0.227771	82.17126	69.81889	<b>0.0038</b>
Rank ≤ 1	0.061070	29.18409	47.85613	0.7595
Rank ≤ 2	0.044755	16.26622	29.79707	0.6934

(Source: EViews Output)

Trace value and Maximum Eigen Value Prob. value imply that at least 1 Cointegration is present among FIIs purchase activities and selected macroeconomic variable. The presence of Cointegration among considered determinants recommends a long term association within the considered determinant variables.

Long term association between FIIs sales activities, Exchange rate, Inflation rate, Interest rate and Sensex for 1 Cointegrating vector from January 1, 2001 to December 31, 2019 is displayed below:

**Long- Run VECM: Cointegrating Equation**

$$ECT_{t-1} = 1.0000 * FII\_S_{t-1} + 289.461923442 * EX_{t-1} + 1264.55308796 * IN_{t-1} - 5415.94384473 * INT_{t-1} - 4.2255254235 * SEN\_CL_{t-1} + 51652.7852046$$

Estimating VECM with FIIs Sales activities as target Variable

$$\Delta FII\_S_t = -0.830465 ECT_{t-1} - 0.0464 \Delta FII\_S_{t-1} + 1825.889 \Delta EX_{t-1} - 176.0812 \Delta IN_{t-1} - 1754.522 \Delta INT_{t-1} + 1.239070 \Delta SEN\_CL_{t-1} + 161.8564$$

**Table 7: VECM for FIIs Purchase activities as Target variable**

	Coefficient	Standard Error	t-Statistics	Prob.
C(1)	-0.830465	0.087252	-9.517974	0.0000
C(2)	-0.046400	0.063479	-0.730942	0.4657
C(3)	1825.889	672.1321	2.716563	0.0072
C(4)	-176.0812	911.8130	-0.193111	0.8471
C(5)	-1754.522	2472.217	-0.709696	0.4787
C(6)	1.239070	0.873066	1.419216	0.1574
C(7)	161.8564	737.8315	0.219368	0.8266
R-squared	0.514006			
Adjusted R-squared	0.499499			
F-statistics	35.43088			
Prob. (F-statistics)	0.000000			

(Source: EViews Output)

In the present VECM for sales, C(1) turned to be negative and significant as highlighted in Table 7, thus fulfilling the requirement of significant VECM and establishing presence of long run Cointegration within selected determiners in the present VECM. R-squared value is 0.514 which is quite acceptable value. Moreover, F-statistics' Prob. value is 0.0000 confirming that fitness of present model.

**Validating the VECM (FIIs Sales activities as Target variable): Residual Diagnostics Test**

VECM' validity is authenticated by different measures conducted on residuals. Series of Residuals must be normally distributed, homoscedasticity with no problem serial correlation. VEC Residual Normality test is

applied to test normality of residuals and test results obtained the Jarque Berra's Prob. value as 0.0847. Hence, that the residuals are normally distributed. For testing serial correlation and heteroscedasticity, the following tests have been applied.

**Breusch-Godfrey Serial Correlation LM Test:**

H<sub>1</sub>: Serial correlation is present among residuals.

**Table 8: Test Statistics**

F-statistic	1.194526	Prob. F(2,199)	0.3050
Obs*R-squared	2.467477	Prob. Chi-Square(2)	<b>0.2912</b>

(Source: EViews Output)

As the Prob. Chi-square is 0.2912 thus H<sub>1</sub> is not accepted at 5% Significance level confirming the absence of serial correlation in residuals.

**Heteroscedasticity Test**

H<sub>1</sub>: Heteroscedasticity is present in the residuals.

**Table 9: Breusch-Pagan-Godfrey Test Statistics**

F-statistic	2.300049	Prob. F(15,191)	0.3822
Obs*R-squared	31.67020	Prob. Chi-Square(15)	<b>0.3267</b>
Scaled explained SS	70.20590	Prob. Chi-Square(15)	0.0008

(Source: EViews Output)

As Chi-square' Prob. value is 0.3267 thus, H<sub>1</sub> is not accepted at 5% Significance level implying that no problem of heteroscedasticity is present in the VECM derived under present study.

**Stability Diagnostics for Model**

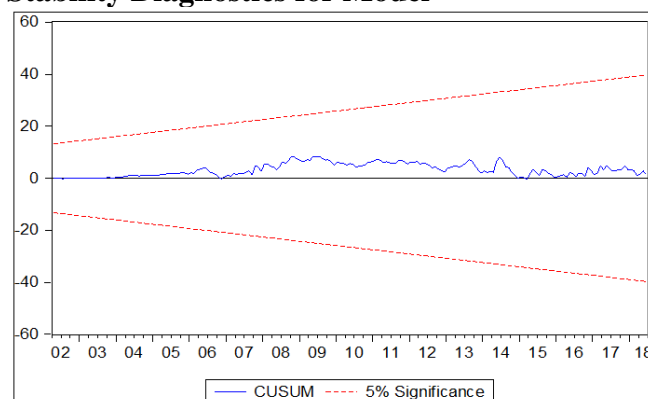


Figure 4: Cusum Test for FIIs Sales VECM

(Source: EViews Output)

The VECM Model for estimating FIIs Sales activities is stable as blue line coming within range of red boundaries as depicted in Figure 4, Hence, the model is said to be dynamically stable.

### Pairwise Granger Causality Test

Table 10: Test Statistics (Lag 2)

Period	Variables	Null Hypothesis	Obs	F-Stat.	Prob.
January 1, 2001 to December 31, 2019	Purchase and Inflation	Inflation rate is not causing FIIs Purchase	226	3.65591	0.0276
		FIIs Purchase is not causing Inflation rate		2.46363	0.0877
	Sales and Inflation	Inflation rate is not causing FIIs Sales	226	3.31459	0.0383
		FIIs Sales is not causing Inflation rate		1.18773	0.307
January 1, 2001 to December 31, 2019	Purchase and Interest Rate	Interest rate is not causing FIIs Purchase	226	1.09920	0.3351
		FIIs Purchase is not causing Interest rate		0.14399	0.866
	Sales and Interest Rate	Interest rate is not causing FIIs Sales	226	1.06047	0.3482
		FIIs Sales is not causing Interest rate		0.87615	0.418
January 1, 2001 to December 31, 2019	Purchase and Sensex	Sensex is not causing FIIs Purchase	226	8.26966	0.0004
		FIIs Purchase is not causing Sensex		5.84961	0.0034
	Sales and Sensex	Sensex is not causing FIIs Sales	226	20.4720	0.00
		FIIs Sales is not causing Sensex		4.00488	0.0197
January 1, 2001 to December 31, 2019	Purchase and Exchange Rate	Exchange rate is not causing FIIs Purchase	226	3.39637	0.0354
		FIIs Purchase is not causing Exchange rate		2.74142	0.0669
	Sales and Exchange Rate	Exchange rate is not causing FIIs Sales	226	8.75554	0.0002
		FIIs Sales is not causing Exchange rate		1.36757	0.2571

(Source: Researcher's Study)

Unidirectional Granger Causality is observed to be existed among "Inflation & FIIs Purchase" and "Inflation and FIIs Sales" as supported by the P-Values of the same which is less than 0.05 thus rejecting the  $H_0$  at 5% significance level. Hence, it is inferred that Indian Inflation rate increase the prediction of FIIs Purchase and Sale activities in Indian Stock Markets but not vice versa. Independence between "Interest rate & FIIs Purchase" and "Interest rate & FIIs Sales" is observed as supported by P-Values of the same. Thus, no Granger Causality is present betwixt Interest rate and FIIs trading activities in Indian Capital Markets. Bidirectional Granger Causality is confirmed betwixt "Sensex & FIIs Purchase" and "Sensex & FIIs Sales" as supported by its P-Value. Hence, it is inferred that Sensex increases the prediction of FIIs purchase & sales activities and vice versa. It is also ascertained that Unidirectional Granger Causality is present between "Exchange rate & FIIs Purchase" and "Exchange rate & FIIs Sale" as supported by P-Value of these 3 groups which are 0.035 and 0.0003 respectively thus rejecting the null hypothesis for the same 3 groups. Hence, it is confirmed that Indian Exchange rate per US dollar does Granger Cause FIIs trading activities but not vice versa.

### Conclusion

The present study is focused to explore the association of FIIs trading activities in India's Equity market with four major macroeconomic variables of India viz. Exchange rate of Indian Rupee per dollar, CPI Inflation rate on year on year basis, S&P BSE Sensex and Interest rate. The paper is focused for examining the contribution of macroeconomic determiners in bringing cash flows from foreign countries to home country' financial markets in form of Foreign Institutional Investment. Johansen Cointegration test results confirmed that presence of Cointegration between FIIs trading activities and behavior of selected four macroeconomic variables. The Vector Error Correction Model taking FIIs trading (Purchase and Sales individually) activities as Target variable confirmed that CPI inflation rate and exchange rate move negatively towards FIIs trading activities in the long period. However, both interest rates and Sensex closing value move positively towards FIIs trading activities in India in the long run. Based upon pairwise Granger Causality test, Exchange rate of Indian Rupee per dollar and CPI Inflation rate are found to be granger causing movement in the FIIs trading activities. Bidirectional Granger causal relation is found between the FIIs trading activities and S&P BSE Sensex closing value. It is implying that Sensex is causing variation in FIIs trading activities and FIIs also are able to bring variations in Sensex through their trading activities. Hence, FIIs are holding capacity to bring volatility in the Benchmark Stock Market Indices of India.

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